

**IN THE CLAIMS**

1. (currently amended) A decoding apparatus comprising:  
acquiring and equalizing means for acquiring encoded data and performing a partial-response equalization on the encoded data, which is an information series encoded by a turbo code and by a run length limited code having a first finite state transition diagram, then converted and carried on an intersymbol interference path; and

means for combined detecting and decoding the equalized, turbo code encoded data based on a trellis corresponding to a second finite state transition diagram that is a combination of the first finite state transition diagram and the intersymbol interference, the trellis satisfying both a run length limitation of the run length limited code and a partial-response characteristic of the partial-response equalization;

wherein the second finite state transition diagram includes states defined based on values of a non-return to zero coding of states in a first finite state transition table; wherein the first finite state transition diagram accords with (2, 7) run length limited code conversion rules.

2-7. (canceled)

8. (currently amended) A decoding method comprising the steps of:

acquiring encoded data and performing a partial-response equalization on the encoded data, which is encoded by a turbo code and by a run length limited code having a first finite state transition diagram, then converted and carried on an intersymbol interference path; and

combined detecting and decoding the equalized, turbo code encoded data based on a trellis corresponding to a second finite state transition diagram that is a combination of the first finite state transition diagram and the intersymbol interference, the trellis satisfying both a run length limitation of the run length limited code and a partial-response characteristic of the partial-response equalization;

wherein the second finite state transition diagram includes states defined based on values of a non-return to zero coding of states in a first finite state transition table; wherein the first finite state transition diagram accords with (2, 7) run length limited code conversion rules.

9. (currently amended) A program storage medium storing a computer-readable program that describes the steps of:

acquiring and equalizing encoded data by performing a partial-response equalization on the encoded data, which is encoded by a turbo code and by a run length limited code having a first finite state transition diagram, converted and carried on an intersymbol interference path; and

combined detecting and decoding the equalized, turbo code encoded data based on a trellis corresponding to a second finite state transition diagram that is a combination of the first finite state transition diagram and the intersymbol interference, converted and carried on an intersymbol interference communication path; the trellis satisfying both a run length limitation of the run length limited code and a partial-response characteristic of the partial-response equalization;

wherein the second finite state transition diagram includes states defined based on values of a non-return to zero coding of

states in a first finite state transition table; wherein the first finite state transition diagram accords with (2, 7) run length limited code conversion rules.

10. (canceled)

11. (currently amended) A recording/reproducing apparatus comprising:

encoding and converting means for encoding an information series by a turbo code and by a run length limited code with a first finite state transition diagram, and performing a partial-response equalization conversion on the encoded data;

recording/reproducing means for recording and reproducing data encoded and converted by the encoding and converting means, in and from a recording medium having an intersymbol interference path;

equalizing means for partial-response equalizing the reproduced data; and

combined detecting and decoding means for detecting and decoding the equalized, turbo code encoded data reproduced based on a trellis corresponding to a second finite state transition diagram that is a combination of the first finite state transition diagram and the intersymbol interference; the trellis satisfying both a run length limitation of the run length limited code and a partial-response characteristic of the partial-response equalization;

wherein the second finite state transition diagram includes states defined based on values of a non-return to zero coding of states in a first finite state transition table; wherein the first finite state transition diagram accords with (2, 7) run length limited code conversion rules.